REMARKS

Claims 1-22 are pending in this application. From the last office action, Claims 1-22 appear to be rejected under 35 U.S.C. 103(a) as being unpatentable over Behfar (WO 00/77620) in view of Oliveria (US6579208), further in view of Lee (US6609127). The Applicants note that the office action actually only says that claims 1-11, 13-18 and 20 are rejected under these references. However, in the detailed description of the office action, the office action mentions the references in connection to claims 1-18, 20-22 (claim 19 not directly addressed) and then the coversheet to the office action says claims 1-22 are rejected. This response responds to all pending claims in light of the three cited references. Reconsideration of the application is hereby respectfully requested.

Applicants assert that the office action fails to make a prima facie case of obviousness because the office action fails to identify a proper motivation or suggestion to combine the teachings of the cited references. Applicants note that the Examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. MPEP §2142. Furthermore, as the Federal Circuit explained, "[i]n the absence of a proper prima facie case of obviousness, an applicant who complies with other statutory requirements is entitled to a patent." *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998).

To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. MPEP §2142; *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Moreover, the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on applicant's disclosure. *Id.*

As further explained by the Federal Circuit in *In re Rouffet*:

> 'virtually all [inventions] are combinations of old elements.' Therefore, an office action may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an office action to use the claimed

> invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be 'an illogical and inappropriate process by which to determine patentability.' To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the office action to show a motivation to combine the reference that create[s] the case of obviousness.

In re Rouffet, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Therefore, in order to establish a prima facie case of obviousness, there must be actual evidence of a suggestion to modify a prior art reference or to combine two prior art references, and the suggestion to combine or modify the prior art must be clear and particular. *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999).

While Behfar discloses a vehicle with an Ethernet network, Behfar does not disclose an active network for controlling the flow of data amongst the devices and there, the office action relies on further combination of Oliveria and Lee. Oliveria relates to a system for providing synchronization shifts between low and high gearing arrangements in a motor vehicle employing a Controller Area Network (CAN) bus system. As explained in Col. 3, lines 3-12, the Controller Area Network bus is a specific "proven, pre-existing, international SAN standard that has been adopted by some vehicle manufacturers. It is readily available, off-the-shelf system that utilizes a minimum of additional components within the vehicle. The CAN system electronically interconnects all the network member by a simple two wire, twisted pair cable and provides high-speed serial digital data transfer between all member in the system."

The office action also mentions that Lee describes this type of legacy automotive bus when it refers to a "CAN system". It is respectfully submitted that although Lee uses the same acronym – it is not referring to the same specific automotive bus that is employed by vehicle manufacturers. CAN in Lee stands for a general control (not controller) area network systems. [See Lee, Col. 2, lines 29-31] The Lee reference is directed to equipment and appliances in a home or business such as a security alarm panel, a television, a microwave oven, a light switch, an alarm clock or a VCR. [See Lee, Col. 2, lines 60-65] The office action concludes that these three (3) references may be combined because it "would have been obvious to one of ordinary skill in the art at the

time the invention was made to incorporate the use of a CAN within Behfar for the purpose of controlling and dynamically reconfiguring data flow through any number of network devices within a vehicle that may also include active networks such as in-car Ethernet LAN." First, it is respectfully submitted that the office action fails to explain how a system that deals with home and business environments relates to using an active network to integrate components within a vehicle system. As mentioned above, the "CAN" in Lee is not the same as the "CAN" in Oliveria – Behfar does not appear to even mention the automotive specific Controller Area Network bus system. Moreover, as mentioned in Oliveria, the automotive-type Controller Area Network bus is an internal standard that facilities off-the-shelf systems. [Oliveria, Col. 3, lines 5-13] To enable this, the Controller Area Network bus uses a standard message protocol. [See Attachment A] The Controller Area Network standardized protocol supports two specific message frame formats. The network in Behfar is described as having devices that are addressable using IP addresses. [Behfar, page 2, lines 34-35; page 3, line 40 – page 4, line 2] Behfar does not suggest or teach how a network with addressable IP addresses would work with an automotive-type Controller Area Network protocols with specific message formats. Additionally, it is not explained how the specific message formats in an automotive-type Controller Area Network protocol would support the home/business environment devices described in Lee.

It is respectfully submitted that there is no motivation to combine the teaching of these three (3) references given the different types of networks, the different types of communication protocols, and the different types of uses (vehicle environment versus home/business environment). Therefore, it is respectfully submitted that the office action fails to show how Behfar, Oliveria, and Lee teach a motivation or suggestion to use an active network for controlling the flow of data amongst the devices. *See* MPEP §2142; *Ex parte Skinner*, 2 U.S.P.Q.2d 1788 (Bd. Pat. App. & Inter. 1986) ("When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper."); *see also Ecolochem, Inc. v. Southern California Edison Company*, 227 F.3d 1361, 1372 (Fed. Cir. 2000) (citing *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999) ("Broad

conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'").

Applicants contend that without anything further, the office action appears to rely solely on hindsight analysis, i.e., taking the disclosure of the pending application as a blueprint for piecing together the prior art. *See Ecolochem, Inc. v. Southern California Edison Company*, 227 F.3d 1361, 1372 (Fed. Cir. 2000) (citing *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999) ("Combining prior art references without evidence of [] a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight."). As stated in In re Rouffet above, this approach has long been rejected by the Federal Courts, and therefore the rejection of the pending claims 1-22 as obvious over Behfar, Oliveria, and Lee is improper.

Applicants further assert that not only is no motivation or suggestion to combine is identified in the office action, no motivation or suggestion can be found in Behfar, Oliveria, and Lee. Behfar is primarily concerned with interconnecting info-tech display devices which do not require time-critical communication. Therefore, in Behfar, a simple network, such as an Ethernet network, would be sufficient to address the concerns disclosed in Behfar. Behfar does not recognize the problem of integrating various vehicle control systems having time-critical applications that require, among other things, communication prioritization or packet translation, and therefore, Behfar cannot possibly suggest any motivation to use any specialized network architecture, such as an active network, for interconnecting its devices.

Although Oliveria is a system for synchronizing shifts between low and high gearing arrangements, its framework is only described in the context of a specific type of automotive bus – the Controller Area Network (CAN). As described above, this type of network uses specific message format protocols. The Lee reference is directed to equipment and appliances in a home or business such as a security alarm panel, a television, a microwave oven, a light switch, an alarm clock or a VCR. [See Lee, Col. 2, lines 60-65] This reference does not recognize the problem of enabling communication between disparate vehicle systems.

For at least the foregoing reasons, Applicants respectfully request reconsideration of the pending rejections.

The Applicants have amended claims 19-22 to clean up some of the language to make it consistent with the main independent claim 14.

* * * *

As the Applicant has overcome all substantive rejections and objections given by the Examiner and have complied with all requests properly presented by the Examiner, the applicants contend that this Amendment, with the above discussion, overcomes the Examiner's objections to and rejections of the pending claims. Therefore, the applicants respectfully solicit allowance of the application. If the Examiner is of the opinion that any issues regarding the status of the claims remain after this response, the Examiner is invited to contact the undersigned representative to expedite resolution of the matter.

The Commissioner is hereby authorized to charge any necessary fee, or credit any overpayment, to Motorola, Inc. Deposit Account No. 50-2117.

Respectfully submitted,
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ATTACHMENT A

CiA

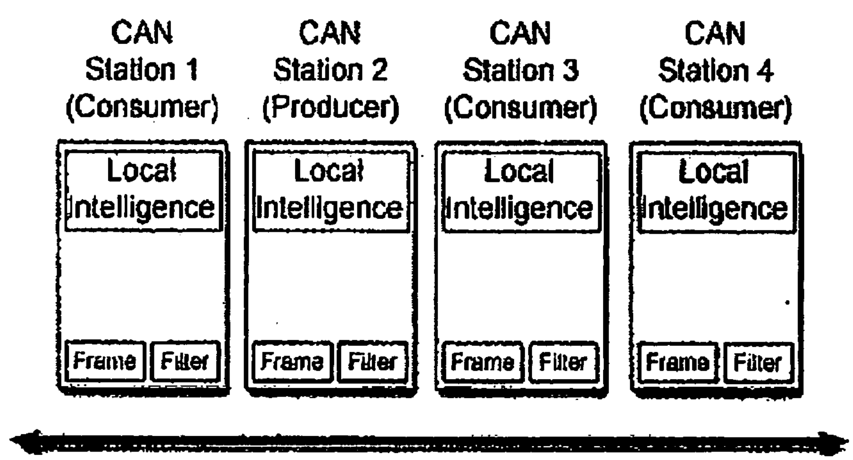
CANopen Conformance Testing (CiA DS 301)

Last modified: 200

Controller Area Network (CAN) - Protocol

The CAN protocol is an international standard defined in the ISO 11898. Beside the CAN protocol itself the conformance test for the CAN protocol is defined in the ISO 16845, which guarantees the interchangeability of the CAN chips.

Principles of data exchange



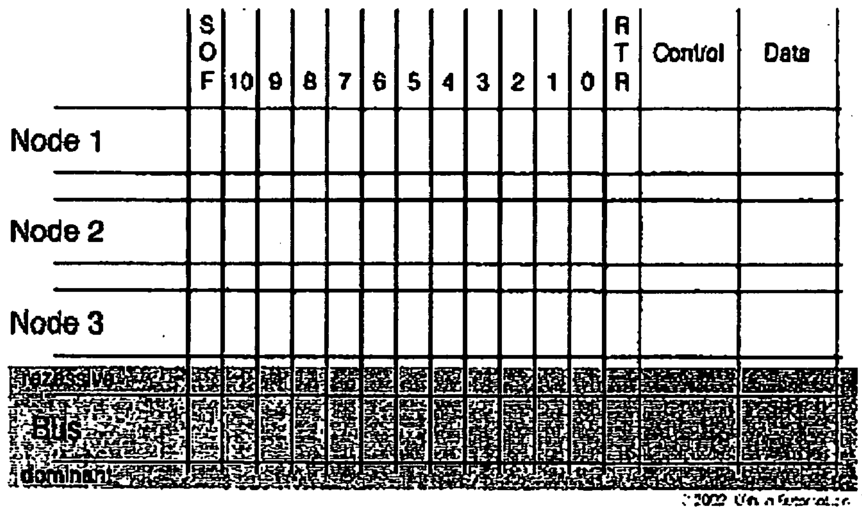
CAN is based on the "broadcast communication mechanism", which is based on a message-oriented transmission protocol. It defines message contents rather than stations and station addresses. Every message has a message identifier, which is unique within the whole network since it defines content and also the priority of the message. This is important when several stations compete for bus access (bus arbitration).

Direct links
- CAN applications
- CAN conformance
- CAN higher layer pr
- CAN history
- CAN physical layer
- CAN standardizatio
- Literature order
- Time triggered communication on C (TTCAN)

C/eAN

As a result of the content-oriented addressing scheme a high degree of system and configuration flexibility is achieved. It is easy to add stations to an existing CAN network without making any hardware or software modifications to the present stations as long as the new stations are purely receivers. This allows for a modular concept and also permits the reception of multiple data and the synchronization of distributed processes. Also, data transmission is not based on the availability of specific types of stations, which allows simple servicing and upgrading of the network.

Real-time data transmission



In real-time processing the urgency of messages to be exchanged over the network can differ greatly: a rapidly changing dimension, e.g. engine load, has to be transmitted more frequently and therefore with less delays than other dimensions, e.g. engine temperature.

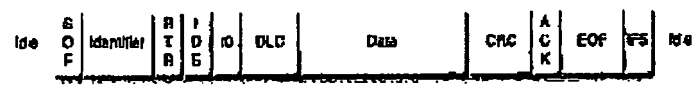
The priority, at which a message is transmitted compared to another less urgent message, is specified by the identifier of each message. The priorities are laid down during system design in the form of corresponding binary values and cannot be changed dynamically. The identifier with the lowest binary number has the highest priority.

Bus access conflicts are resolved by bit-wise arbitration of the identifiers involved by each station observing the bus level bit for bit. This happens in accordance with the wired-and-mechanism, by which the dominant state overwrites the recessive state. All those stations (nodes) with recessive transmission and dominant observation lose the competition for bus access. All those "losers"

automatically become receivers of the message with the highest priority and do not re-attempt transmission until the bus is available again.

Transmission requests are handled in order of their importance for the system as a whole. This proves especially advantageous in overload situations. Since bus access is prioritized on the basis of the messages, it is possible to guarantee low individual latency times in real-time systems.

Message frame formats



The CAN protocol supports two message frame formats, the only essential difference being in the length of the identifier. The "CAN base frame" supports a length of 11 bits for the identifier (formerly known as CAN 2.0 A), and the "CAN extended frame" supports a length of 29 bits for the identifier (formerly known as CAN 2.0 B).

CAN base frame format

A CAN base frame message begins with the start bit called "Start Of Frame (SOF)", this is followed by the "Arbitration field" which consist of the identifier and the "Remote Transmission Request (RTR)" bit used to distinguish between the data frame and the data request frame called remote frame. The following "Control field" contains the "IDentifier Extension (IDE)" bit to distinguish between the CAN base frame and the CAN extended frame, as well as the "Data Length Code (DLC)" used to indicate the number of following data bytes in the "Data field". If the message is used as a remote frame, the DLC contains the number of requested data bytes. The "Data field" that follows is able to hold up to 8 data byte. The integrity of the frame is guaranteed by the following "Cyclic Redundant Check (CRC)" sum. The "ACKnowledge (ACK) field" compromises the ACK slot and the ACK delimiter. The bit in the ACK slot is sent as a recessive bit and is overwritten as a dominant bit by those receivers, which have at this time received the data correctly. Correct messages are acknowledged by the receivers regardless of the result of the acceptance test. The end of the message is indicated by "End Of Frame (EOF)". The "Intermission Frame Space (IFS)" is the minimum number of bits separating consecutive messages. Unless another station starts transmitting, the bus remains idle after this.

CAN extended frame format

The difference between an extended frame format message and a base frame format message is the length of the identifier used. The 29-bit identifier is made up of the 11-bit identifier ("base

identifier") and an 18-bit extension ("identifier extension"). The distinction between CAN base frame format and CAN extended frame format is made by using the IDE bit, which is transmitted as dominant in case of an 11-bit frame, and transmitted as recessive in case of a 29-bit frame. As the two formats have to co-exist on one bus, it is laid down which message has higher priority on the bus in the case of bus access collision with different formats and the same identifier / base identifier: The 11-bit message always has priority over the 29-bit message.
The extended format has some trade-offs: The bus latency time is longer (in minimum 20 bit-times), messages in extended format require more bandwidth (about 20 %), and the error detection performance is lower (because the chosen polynomial for the 15-bit CRC is optimized for frame length up to 112 bits).

CAN controllers, which support extended frame format messages are also able to send and receive messages in CAN base frame format. CAN controllers that just cover the base frame format do not interpret extended frames correctly. However there are CAN controllers, which only support the base frame format but recognize extended messages and ignore them.

Detecting and signalling errors

Unlike other bus systems, the CAN protocol does not use acknowledgement messages but instead signals errors immediately as they occur. For error detection the CAN protocol implements three mechanisms at the message level:

- Cyclic Redundancy Check (CRC): The CRC safeguards the information in the frame by adding a frame check sequence (FCS) at the transmission end. At the receiver this FCS is re-computed and tested against the received FCS. If they do not match, there has been a CRC error.
- Frame check: This mechanism verifies the structure of the transmitted frame by checking the bit fields against the fixed format and the frame size. Errors detected by frame checks are designated "format errors".
- ACK errors: Receivers of a message acknowledge the received frames. If the transmitter does not receive an acknowledgement an ACK error is indicated.

The CAN protocol also implements two mechanisms for error detection at the bit level:

- Monitoring: The ability of the transmitter to detect errors is based on the monitoring of bus signals. Each station that transmits also observes the bus level and thus detects differences between the bit sent and the bit received. This permits reliable detection of global errors and errors local to the transmitter.
- Bit stuffing: The coding of the individual bits is tested at bit level. The bit representation

used by CAN is "Non Return to Zero (NRZ)" coding. The synchronization edges are generated by means of bit stuffing. That means after five consecutive equal bits the transmitter inserts a stuff bit into the bit stream. This stuff bit has a complementary value, which is removed by the receivers.

If one or more errors are discovered by at least one station using the above mechanisms, the current transmission is aborted by sending an "error frame". This prevents other stations from accepting the message and thus ensures the consistency of data throughout the network. After transmission of an erroneous message that has been aborted, the sender automatically re-attempts transmission (automatic re-transmission). Nodes may again compete for bus access.

However effective and efficient the method described may be, in the event of a defective station it might lead to all messages (including correct ones) being aborted. If no measures for self-monitoring were taken, the bus system would be blocked by this. The CAN protocol therefore provides a mechanism to distinguish sporadic errors from permanent errors and local failures at the station. This is done by statistical assessment of station error situations with the aim of recognizing a station's own defects and possibly entering an operation mode in which the rest of the CAN network is not negatively affected. This may go as far as the station switching itself off to prevent other nodes' messages erroneously from being recognized as incorrect .